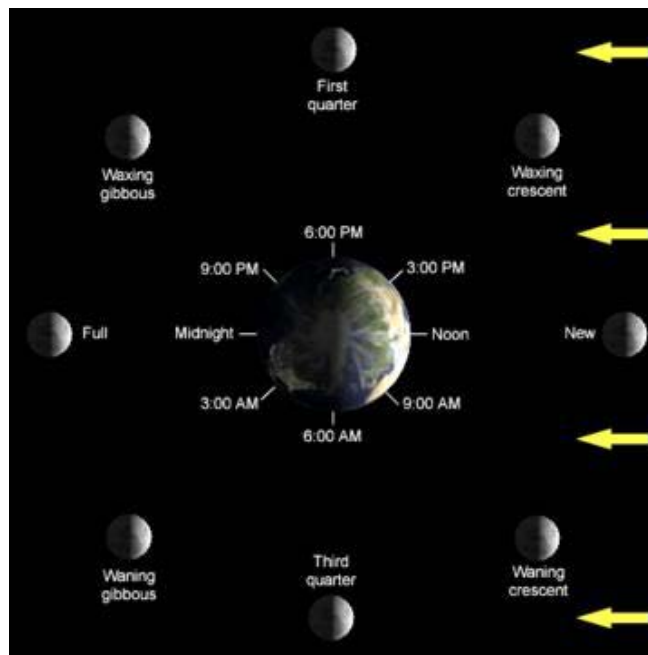


## Lunar Phases

(<http://www.wonderville.ca/v1/activities/phases/phases.html>)

**Grade Level:** 5

**Concepts:** The phases of the moon are caused by the Moon's revolution around the Earth and the sun's reflection on the moon. Light is not emitted by the Moon itself; rather, the Sun acts as the constant light source. The phases in sequential order are: New Moon, Crescent, First Quarter, Waxing Gibbous, Full Moon, Waning Gibbous, Last Quarter, Crescent, and New Moon. In this lesson, students will investigate the phases of the Moon and understand why this cycle occurs monthly.



### Objectives:

- The students will identify and illustrate the phases of the moon in sequential order
- The students will be able to explain why the phases of the moon are a result of the moon's revolution around the earth

### Material List and Advanced Preparation:

#### For the class:

- Lamp
- Extension Cord

#### For each pair of students:

- Foam ball with a dowel rod pushed through the N-S axis
- Flashlight

ENGAGEMENT		
What the Teacher Will Do	Eliciting Questions/ Student Responses	What the Students Will Do
<a href="http://www.google.com/moon/">http://www.google.com/moon/</a> Show students Google moon so they can see where and when astronauts have landed. Zoom in on Apollo 11 to show the students where the American Flag was planted.	<p>Do you think these astronauts knew a lot about the moon before they decided to fly up there? (<i>they must have</i>)</p> <p>Somebody raise their hand and tell me one thing they know about the moon? (repeat for several</p>	Participate in the engagement

EXPLORATION		
What the Teacher Will Do	Eliciting Questions/ Student Responses	What the Students Will Do
Begin by asking students what a model is.	<p>What is a model?</p> <p>What are some limitations of a model? Benefits?</p> <p>How will a model help us explore how the phases of the moon occur?</p>	Students will answer questions.
<p>Divide the class into pairs.</p> <p>Assign each student in the pair either as 1 or 2. This will correspond to their role in the activity.</p> <p>Pass out one foam ball and flashlight to each pair.</p>		Students will divide into pairs.
<p>Student 1 will hold the flashlight, which will act as the Sun. Student 2 will act as Earth and hold the foam ball. The ball will act as the moon. Student 2 will first hold the Moon in front of them and a little above their head with student 1 holding the light pointing at the moon. This will be the first phase (New Moon). Student 2 will then move counterclockwise until they are facing away from the light. The light appears to increase from right to left on the side of the model facing student 2 (Earth). This means the Moon is waxing. Students will continue to rotate counterclockwise, noting that the light appears to decrease from right to left on the side of the model facing student 2; this means the moon is waning. One complete rotation is done. Students should continue this one more time with the teacher guiding them through the names. Students will switch places and repeat the activity.</p>	<p>Where is the light being emitted from? (<i>the sun</i>)</p> <p>How much of the moon is lit up by the Sun? (<i>half</i>)</p>	<p>Students will observe the different phases.</p> <p>Students will answer questions to guide them through the phases.</p> <p>Students will act as both the Sun and the Earth.</p>

ELABORATION		
What the Teacher Will Do	Eliciting Questions/ Student Responses	What the Students Will Do
<p>Pass out the Moon Puzzle activity to each student. Ask students to label each phase with the correct name.</p> <p>Make sure that students are doing the activity themselves. This is not a group activity. Remind students that if they are getting confused, to think back to the activity. Have them take notes.</p>	<p>Where is the light being emitted from? (<i>the Sun</i>)</p> <p>What phase is this? How do you know this? What causes the Moon to look different?</p> <p>What does waxing mean? (<i>waxing is when the moon seems to be getting larger over time</i>)</p> <p>What does waning mean? (<i>waning is when the moon seems to be getting smaller over time</i>)</p>	<p>Students will take notes on the phases of the Moon as they complete the puzzle.</p>

## Evaluation

Directions: Answer each question to the best of your ability.

1. True or False: The moon produces light.
2. Which of the following states the correct order of the moon phase?
  - a. New Moon, First Quarter Moon, Waxing Gibbous Moon, Waxing Crescent Moon, Full Moon, Waning Gibbous, Last Quarter Moon, Waning Crescent Moon
  - b. *New Moon, Waxing Crescent Moon, First Quarter Moon, Waxing Gibbous Moon, Full Moon, Waning Gibbous Moon, Last Quarter Moon, Waning Crescent Moon*
  - c. New Moon, Full Moon, First Quarter Moon, Waning Crescent Moon, Waxing Gibbous Moon, Last Quarter Moon, Waning Gibbous Moon, Waxing Crescent Moon
3. Illustrate all 8 phases of the Moon and correctly label those phases. Include the Sun and the Earth. (Hint: Think about the notes we took and the activity)
4. The phases of the Moon occur because:
  - a. Clouds cover part of the Moon
  - b. The Earth's shadow falls upon the Moon
  - c. *The Moon revolves around the Earth*